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SCAFFOLD LIFT SYSTEM

Background of the Invention

Field of the Invention

The present invention relates to a lift system, and in particular to a lift system such as may be utilized for lowering and raising scaffolding.

Description of the Prior Art

Scaffolding is commonly used in the building industry where workers are erecting walls or working at an elevated position. Multiple story scaffolding systems are typically self supporting, such as tower scaffolding. For systems that are needed for raised elevations, but are not raised more than one or two stories above the ground, scaffolding may be supported by the building or structure being erected or worked on.

A common system for such lower level elevated applications has been a pump jack system. Pump jack systems normally include a pair of posts with each post including a pump jack connected thereto. The jacks support a platform for workers to stand on. Pump jacks typically are pedal operated to raise the platform on the posts and often utilize a hand operated crank to lower the platform. Both the crank and pedal are typically actuated by the worker standing on the platform.

Although such systems may be workable for certain applications, there are several drawbacks. The pump jack type systems require much exertion from the operator to raise or lower the pump jacks and scaffolding platform. In addition, the systems are complicated and require extra time for setting up and disassembly. Such systems have many moving parts and are not easily transported. Such systems are also difficult to use in inclement weather or at lower temperatures.

It can be seen then that a new and improved system is needed for lifting platforms and scaffolding systems. Such a system should provide for easy setup and take down as well as being easily transported. In addition, such a system should be easily operated by scaffolding users with minimal effort and provide for improved safety. The present invention addresses these as well as other problems associated with scaffolding lift systems.

Summary of the Invention

The present invention is directed to a scaffolding lift system. The scaffolding system includes two vertical posts or poles that are engaged by and support a platform assembly configured for allowing workers to stand on or walk on while working. The platform preferably includes rails and a shelf for holding materials. In one embodiment, the platform may include a caddy and rails for providing for movement of the caddy along the platform.

The posts may include upper supports extending outward to engage the vertical surface of the wall for additional support. The posts also have a toothed track formed along one side for engagement by a complementary traveler device mounted to the platform assembly. The traveler device provides for lifting and lowering of the platform assembly along the post. The traveler device has a housing including rollers engaging opposite ends of the posts, along one side of the post along is formed the toothed track. A spur gear extends inward from the traveler device to engage the toothed track. Rotation of the spur gear lifts and lowers the traveler device, depending on the direction of rotation. The sprocket gear is driven by a worm type gear that includes an actuator engagement portion. The actuator engagement portion may be attached to a drill having a special fitting, such as a hex head to drive the worm gear. A crank may also be utilized for rotating the worm gear. The worm gear rotates several times for each rotation of the sprocket, thereby providing a mechanical advantage so that the platform assembly may be easily lowered and raised by one person, even when supporting workers and their gear. In addition, the drive train and gears provide a natural braking resistance so that the platform assembly does not accidentally slide down the posts under its own weight. In addition to the resistance and braking characteristics of the drive system, a separately operated foot brake also engages the

toothed track and provides additional backup. The foot brake may be easily actuated and disengaged while the user's foot is also actuating the traveler device. The brake is typically spring loaded and configured to ride over the teeth when raised.

The present invention overcomes the drawbacks of the prior art and provides easy actuation, transport and assembly that is not provided for in the prior art. The present provides a safe scaffolding system that is reliable under all types of weather conditions and that does not require complicated machinery or an engine to run.

These features of novelty and various other advantages that characterize the invention are pointed out with particularity in the claims annexed hereto and forming a part hereof. However, for a better understanding of the invention, its advantages, and the objects obtained by its use, reference should be made to the drawings that form a further part hereof, and to the accompanying descriptive matter, in which there is illustrated and described a preferred embodiment of the invention.

Brief Description of the Drawings

Referring now to the drawings, wherein like reference numerals and letters indicate corresponding structure throughout the several views:

Figure 1 shows a perspective view of a scaffolding system according to the principles of the present invention;

Figure 2 shows a front elevational view of the scaffolding system of Figure 1;

Figure 3 shows a top plan view of the scaffolding system of Figure 1;

Figure 4 shows an end view of the scaffolding system of Figure 1;

Figure 5 shows an end sectional view with of the scaffolding system taken along line 5-5 of Figure 2;

Figure 6 shows a side partial sectional view of a first embodiment of a traveler device for the scaffolding system of Figure 1;

Figure 7 shows a side sectional view of the traveler device of Figure 6 and rollers for the scaffolding system of Figure 1;

Figure 8 shows an end partial sectional view of the traveler device of Figure 6;

Figure 9 shows a top view of the traveler device of Figure 6;

Figure 10 is an exploded perspective view of a second embodiment of a traveler device for the scaffolding system of Figure 1; and

Figure 11 shows a side sectional view of the traveler device shown in Figure 10.

Detailed Description of the Preferred Embodiment

Referring now to the drawings and in particular to Figures 1-5, there is shown a scaffolding system, generally designated **20,** according to the principles of the present invention. The scaffolding system **20** includes a platform assembly **30** supported on a pair of poles or posts **22** with one disposed at each end of the platform assembly **30**. The posts **22** include wall supports **26** that are configured for positioning the system **20** relative to a wall and also provide additional support at the upper end of each post **22**. The platform assembly **30** includes a deck **32** configured for allowing workers to stand and walk on during use. Railings **34** extend around portions of the deck **32** and provide for additional safety and support. An upper shelf or ledge **36** is positioned above the deck **32** and on the opposite side of the post **22**. The shelf **36** is typically utilized for storing materials and supplies.

The platform assembly **30** may also include a caddy **38** slidably mounted on rails **40** that may also form a portion of the railing **34**. A mounting portion **42** supports the platform assembly **30** and includes a first embodiment of a traveler device **50** shown in Figures 6-9 or a second embodiment of a traveler device **150** shown in Figures 10-11, which engages the associated post **22,** as further explained below.

Referring now to Figures 6-9, each of the lift devices **50** travels vertically along its associated post **22**. The lift device **50** includes a gear housing **58** attached to a roller housing **60**. The roller housing **60** is configured to extend around the posts **22** and receive rollers **70** and **72** that engage opposite ends of the generally oval posts **22**. The rollers **70** are typically made of a plastic or other material and are spaced apart, as shown in Figure 7, to provide added engagement security. The rollers **70** include an arcing contour that substantially matches the corresponding outer surface of the associated post **22**. The rollers **70** of each traveler device **50** engage the associated post **22** at different heights, as shown in Figure 7, for improved support and alignment.

As shown in Figure 9, on one side of the post **22** is formed the track **24** having teeth disposed there along that engage complementary teeth on a gear on the traveler assembly, as shown most clearly in Figure 6. A spur type gear **54** has teeth that mate to the teeth of the track **24**. Therefore, as the gear **54** is rotated, the lift device **50** moves up and down the posts **22**. The gear **54** is actuated by a worm gear **52** positioned at the side of the gear **54** opposite the posts **22**. The worm type gear **52** engages the sprocket type gear **54** and rotation of the worm gear **52** actuates the spur **54**. The spur gear **54** does not rotate as often as the worm gear **52**, so that a mechanical advantage is provided. The worm gear **52** includes a driver engagement **56**. The driver engagement **56** is configured to couple to a tool, such as a power drill or a hand crank. In this manner, a cordless drill, such as is often utilized for tasks performed on the scaffolding assembly **20**, may be placed on the engagement portion **56** and the scaffolding may be easily raised or lowered with mechanical advantage provided through the gear drive train. The housing **58** is angled for easier access and actuation of the driver engagement **56** by a worker with either a crank or drill.

Referring again to Figure 1, as a safety precaution, a brake **80** mounts to the platform assembly **30** and also engages the teeth of the track **24**. The brake **80** is easily operated with the users foot and is spring loaded to prevent accidental uncoupling. The brake **80** acts as a secondary safety device as the gears **52** and **54** have sufficient resistance that the platform assembly **30** cannot accidentally drop or slip under its own weight, or when loaded.

In use, the brake **80** is disengaged from each of the posts **22** and the actuator, such as a drill or hand crank, is attached to the driver engagement portion **56** of the worm gear **52**. The drills are rotated in the same direction to either raise or lower each of the lift devices **50**, thereby raising or lowering the platform assembly **30** relative to the posts **22**. It can also be appreciated that the lift devices **50** may be operated independently so long as the devices are moved only a short distance at a time and alternated. The brake **80** is also configured to ride over the tracks **24** on the way up so that the brake **80** need not be disengaged in order to raise the platform, only to lower the platform assembly **20**, thereby acting as a ratchet device.

Referring now to Figures 10 and 11, a second embodiment of the traveler device **150** is shown. The traveler device **150** operates in a similar manner to the traveler device **50**, but includes additional gears to provide a greater mechanical advantage for applications in which a different gear ratio is needed. The traveler device **150** mounts in a similar manner and engages the teeth of the track **24** in the same manner as the traveler device **50**. The traveler device **150** includes a housing **158** retaining a drive train for the traveler device **150**. A planetary spur type gear **154** has exterior teeth **164** that mate to the teeth of the track **24**. The traveler device **150** is driven by a worm gear **152** receiving an input from a driver with an engagement portion **156**. The driver engagement **156** is configured to couple to a tool, such as a power drill or hand crank. The drive engagement **156** is directly mounted to a worm gear **152** that rotates with the driver. The worm gear **152** engages a spur gear **166** coaxially mounted to a second set of spur gears **160**. The spur gears **160** are shown as three gears formed out of thin material, but may also be a single monolithic gear. Rotation of the worm gear **152** drives the spur gear **166** and the gears **160**. The gear **160** engages interior teeth **162** of the planetary type spur gear **154** while exterior teeth **164** engage the track **24.** Therefore, as the worm gear **152** is rotated, it drives the gear **154** moving the traveler device **150** and therefore, the scaffolding **20** up and down. It can be appreciated that the traveler device **150** provides a reduction between the rotation of the worm gear **152** through the gear train **166, 160** and **154**. The traveler device also provides a further reduction and greater mechanical advantage so that less power is needed for input and provide for easier lifting and lowering of the entire scaffolding system and greater capacity with less power.

It is to be understood, however, that even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and function of the invention, the disclosure is illustrative only, and changes may be made in detail, especially in matters of shape, size and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.